

REMARKS

Claims 1-2 were previously withdrawn. Claims 3-13 were pending in the case for consideration, of which all claims stand rejected. Additionally, the specification is objected to.

In this Amendment, the specification and claim 3 and 5 are amended; claims 4 and 9-13 are canceled; and new claims 14-23 are added. Claims 3, 6-8 and 14-23 are presently pending in the application.

Claim 4 is canceled, and claim 3 is amended to recite that the cleaning solution comprises about 0.01% to about 0.11% of hydrofluoric acid. This amendment clarifies the HF composition of the claimed cleaning solution and raises the lower end of the HF concentration range to 0.01%.

New base 14 parallels original base claim 3; the hydrofluoric acid component of the recited cleaning solution has been differently expressed. Claims 15-18 recite further method limitations that were previously claimed in original claims 5-8. No new matter is added.

New base claim 19 is drawn to a method similar to that recited in claim 9 and disclosed in the specification. Claims 20-23, depending therefrom, parallel the subject matter of original claims 10-13. No new matter is added.

In addition, Applicant presents the following remarks.

Objections to Specification and Claims

The applicants have amended the specification and claims to replace the term “hydrogen fluoric acid solution” with “HF solution” and to replace the term “hydrogen fluoric acid” with “hydrofluoric acid.”

Claim Rejections – 35 U.S.C. § 102(a)

Claims 3-5 and 8 are rejected under 35 U.S.C. § 102(a) as being anticipated by U.S. Patent No. 6,630,074 to Rath et al. (“Rath ‘074”). The applicants respectfully traverse the rejection, although it is believed mooted by the present amendment to claim 3.

The Examiner asserts that Rath ‘074 teaches a solution that contains “about 0.1 to about 100 ppm of a fluoride containing compound, preferably hydrofluoric acid” (column 3, lines 46-48).

Claim 3 as amended recites that the cleaning solution comprises “about 0.01% to about 0.11% of hydrofluoric acid”—i.e., about 100 ppm to about 1100 ppm HF. This HF

concentration range is not disclosed in Rath '074. Claim 3, and claims depending therefrom, are allowable over the cited art. Similarly, new claims 14-28 are allowable over Rath '074.

Claim Rejection – 35 U.S.C. § 103(a)

Claim 6 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Rath. The applicants respectfully traverse the rejection, although the rejection is further believed mooted by the present amendment to claim 3.

Applicant notes that Rath '074 expressly teaches away from cleaning solutions having HF concentrations greater than 100 ppm—indeed, Rath '074 urges that HF concentrations greater than 40 ppm are not preferred and are to be avoided. (See Rath '074, col. 3, lns. 51-54 (“It is preferred that the fluoride containing compound be able to contribute the equivalent of at least about 8 and *at most about 12 ppm of hydrofluoric acid* to the etchant solution.” (italics added)); col. 4, lns. 31-36 (“Since hydrofluoric acid is known to etch aluminum/copper, the *amounts in the etchant solution must be small*. When the amounts of hydrofluoric acid in the claimed etchant solution are kept small (*less than about 40 ppm*) the potentially detrimental effects of the hydrofluoric acid on aluminum/copper are minimized.” (italics added)); and col. 4, line 53 to col. 5, line 8 (teaching that etchant solution pH must be controlled to thereby control zeta potentials and prevent polymer redeposition).)

Rath '074 teaches a lower HF concentration range and expressly teaches away from such higher HF concentrations as are recited in Applicant's pending claim 6. Claim 6 therefore is allowable over the cited art.

Claim Rejection – 35 U.S.C. § 103(a)

Claims 7 and 9-13 are rejected under U.S.C. § 103(a) as being unpatentable over Rath in view of U.S. Patent 6,664,196 to Wada et al. (“Wada '196”). The applicants respectfully traverse the rejection on the grounds previously stated, although the rejection is further believed mooted by the present amendment to independent claim 3.

The Examiner asserts that Wada '196 speaks of treatment steps lasting for 1, 2 or 3 minutes. Applicant points out that Wada '196 employs a 0.0008% HF solution (i.e., 8 ppm HF solution). (Wada '196, Table 1.) Coupled with Rath '074's teaching that over-long exposure of the semiconductor device to HF is detrimental, one of ordinary skill is taught away from (a) increasing the concentration of HF above that taught by Rath '074 and using the same immersion time as taught by Wada '196; (b) using the HF concentration as taught by Rath '074 but using the immersion time above that taught by Wada '196; or (c) increasing

both the HF concentration of Rath '074 and the immersion time of Wada '196 . One of ordinary skill, presented with Applicant's cleaning solution, is guided by Rath '074 to reduce immersion time. In contrast, Applicant's claimed immersion time—in a cleaning solution much more concentrated than that of Rath '074—nevertheless is up to three times longer than the time disclosed in Wada '196.

The ordinary skilled artisan is taught away from the method as claimed by Applicants. Claim 7 therefore is allowable over the cited art as combined.

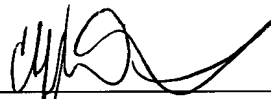
Conclusion

For the foregoing reasons, reconsideration and allowance of claims 3, 5-8 and 14-23 of the application as amended is requested. Please telephone the undersigned at (503) 222-3613 if it appears that an interview would be helpful in advancing the case.

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I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail in an envelope addressed to: Mail Stop Amendment, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450
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